

REMARKS

The Applicants respectfully request further examination and reconsideration in view of the above amendment and the remarks below. Previously, claims 1-32 were pending in the application, of those claims 1-32 were rejected. Claim 1 is amended above, and claims 1-32 are still pending.

Request for Consideration of Information Disclosure Statements

The Applicants respectfully request that the Examiner provide notice that several prior-filed Information Disclosure Statements ("IDS") were considered. Specifically, the Applicants have received no record that the six electronic IDS with EFS IDs 60085, 60086, 60087, and 60088, which were electronically filed on April 29, 2004; the electronic IDS with EFS ID 76815, which was electronically filed on January 26, 2005; and the electronic IDS with EFS ID 77188, which was electronically filed on February 1, 2005; have been considered. Accordingly, the applicants request that these IDS be considered and their consideration confirmed along with the next office action.

Claim Rejections Under 35 USC §103

Claims 1-32 stand rejected under 35 USC §103(a) as being unpatentable over "Modeling of Two-Phase Microchannel Heat Sinks for VLSI Chips" by Koo et al. ("Koo"), in view of at least Japanese Patent 01-256775 to Yamaguchi et al. ("Yamaguchi"). Several of claims are rejected in further view of one or more of the following: U.S. Patent 6,182,742 to Takahashi et al. ("Takahashi"), U.S. Patent Publication US 2003/0121274 to Wightman ("Wightman"), U.S. Patent Publication US 2004/0089008 to Tilton et al. ("Tilton"), U.S. Patent 6,775,996 to Cowans ("Cowans"), U.S. Patent Publication 2004/0040695 to Chesser et al. ("Chesser"), U.S. Patent 6,023,934 to Gold ("Gold"), and "A Closed-Loop Electroosmotic Microchannel Cooling System for VLSI Circuits" by Jiang et al. ("Jiang"). The Applicants respectfully traverse the rejections within the Office Action and submit that the various combinations of references relied upon within the Office Action do not make obvious the instant invention, as further outlined below.

The primary reference combination relied upon to show obviousness of the claimed invention was that of Koo in view of Yamaguchi as applied to claim 1.

The above amendment clarifies claim 1 to specifically recite that the pressure of "flowing fluid in the heat exchanger" is adjusted, e.g. adjustment takes place during operation of the heat exchanger. Within the Office Action, it is stated (FIG. references omitted),

Koo discloses applicant's basic inventive concept, a method of cooling a heat-generating device using a pump to cause a fluid to flow in a heat exchanger and having a heat rejector, substantially as claimed.

The Office Action further contends,

5 [Koo does not state] specifically that the pressure of the refrigerating fluid is adjusted in the system to correspondingly adjust the boiling point temperature of the fluid in the heat exchanger.

The literal teaching of figure 1 of Koo, disclosing an IC chip cooled by a microchannel heat exchanger through which fluid is pumped, can perform a method similar to that recited within the first subparagraph of claim 1: using a pump to cause fluid to flow in a heat exchanger. In this case, convective cooling occurs as shown by equation (6) of Koo and related discussion. However, Koo does not teach, hint or suggest that a pressure of the *flowing* fluid is adjusted to adjust a boiling point temperature of the fluid in the heat exchanger.

15 Further, Yamaguchi, as cited, also does not teach that a pressure of a *flowing* fluid within a cooling system is adjusted to correspondingly adjust a boiling point temperature of the fluid within a heat exchanger.

The cited portion of Yamaguchi describes a "cooling device" with "two *independent* cooling units, liquid and evaporation cooling units" [Applicants' emphasis] which includes a relief valve that "allows free adjustment of the boiling point of *the refrigerant for evaporation cooling* by changing the pressure of the refrigerant." Yamaguchi's boiling point adjustments rely on *evaporative* cooling, and there is no teaching or suggestion within the cited portion of Yamaguchi that such adjustment would be desirable or even effective in *convective* cooling. Accordingly, the cited portion of Yamaguchi does not include any teaching, hint or even a suggestion that the flowing fluid pressure be adjusted to correspondingly adjust the boiling point temperature of the fluid.

25 Therefore, the cited portion of Yamaguchi fails to establish that adjusting a pressure within a *convective* heat exchanger system to correspondingly adjust the boiling point within the system is old in the refrigeration art.

The requirements for establishing a *prima facie* case of obviousness are well settled, [MPEP §2143]

35 To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable

expectation of success must both be found in the prior art, and not based on applicant's disclosure.

Using the cited references, a *prima facie* case of obviousness has not been established. As shown above, as cited, Yamaguchi does not present a device that teaches or suggests the claim limitation expressed in subparagraph two of the first claim of the present invention: "adjusting a pressure of the flowing fluid to correspondingly adjust a boiling point temperature of the fluid in the at least one heat exchanger." Hence, the cited combination of Koo and Yamaguchi fails to teach or suggest all the claim limitations.

Specifically, claims 1 and 4 are rejected as being as being obvious over Koo in view of Yamaguchi. The amended claim 1 describes a method of cooling at least one heat-generating device using a cooling system. The method includes the steps of using at least one pump to cause a fluid to flow in at least one heat exchanger; and adjusting a pressure of the flowing fluid to correspondingly adjust a boiling point temperature of the fluid in the at least one heat exchanger. As described above, the cited combination of Koo and Yamaguchi does not teach or suggest a system in which a pressure of a flowing fluid is adjusted to correspondingly adjust a boiling point temperature. For at least these reasons, claim 1 is allowable over the teachings of Koo in view of Yamaguchi.

Claim 4 depends from claim 1, which is allowable over Koo in view of Yamaguchi for the reasons presented above. Thus, claim 4 is allowable as being dependent from an allowable base claim.

Claims 2, 27, and 28 are rejected over Koo in view of Yamaguchi as applied to claim 1 and further in view of Takahashi. Claims 2, 27 and 28 depend from claim 1, which is allowable over Koo in view of Yamaguchi for the reasons presented above. Thus, claims 2, 27, and 28 are allowable as being dependent from an allowable base claim.

Claims 3, 14-21, 26, 31, and 32 are rejected over Koo in view of Yamaguchi as applied to claim 1 and further in view of Wightman. Claims 3, 14-21, 26, 31, and 32 depend from claim 1, which is allowable over Koo in view of Yamaguchi for the reasons presented above. Thus, claims 3, 14-21, 26, 31, and 32 are allowable as being dependent from an allowable base claim.

Claims 5-7 and 9-11 are rejected over Koo in view of Yamaguchi and further in view of Tilton. Claims 5-7 and 9-11 depend from claim 1, which is allowable over Koo in view of Yamaguchi for the reasons presented above. Thus, claims 5-7 and 9-11 are allowable as being dependent from an allowable base claim.

Claim 8 rejected over Koo in view of Yamaguchi as applied to claim 1 and further in view of Tilton as applied to claim 5, and still further in view of Cowans. Claim 8 depends from claim 1, which is allowable over Koo in view of Yamaguchi for the reasons presented above. Thus, claim 8 is allowable as being dependent from an allowable base claim.

Claims 12 and 13 are rejected over Koo in view of Yamaguchi as applied to claim 1 and further in view of Chesser. Claims 12 and 13 depend from claim 1, which is allowable over Koo in view of Yamaguchi for the reasons presented above. Thus, claims 12 and 13 are allowable as being dependent from an allowable base claim.


Claims 22-25 are rejected over Koo in view of Yamaguchi as applied to claim 1 and further in view of Gold. Claims 22-25 depend from claim 1, which is allowable over Koo in view of Yamaguchi for the reasons presented above. Thus, claims 22-25 are allowable as being dependent from an allowable base claim.

Claims 29 and 30 are rejected over Koo in view of Yamaguchi as applied to claim 1 and further in view of Jiang. Claims 29 and 30 depend from claim 1, which is allowable over Koo in view of Yamaguchi for the reasons presented above. Thus, Claims 29 and 30 are allowable as being dependent from an allowable base claim.

For the reasons given above, the Applicant respectfully submits that the pending claims 1-32 are in a condition for allowance, and allowance at an early date would be appreciated. If the Examiner has any questions or comments, he is encouraged to call the undersigned at (408) 530-9700 so that any outstanding issues can be expeditiously resolved.

Respectfully submitted,
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Dated: 11-9-05

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CERTIFICATE OF MAILING (37 CFR § 1.8(a))

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